Before the
Federal Communications Commission
Washington, D.C.

In the matter of:

Revitalization of the AM Radio Service	**)**	**MB Docket No. 13-249**
	)	**FCC 18-139**
Second Further Notice of Proposed Rulemaking	**)**	

REPLY COMMENTS OF KINTRONIC LABORATORIES, INC.

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The domestic and international broadcast radio engineering, design, and manufacturing firm of Kintronic Laboratories, Inc. ("KTL") hereby submits these Reply Comments in response to the Commission's recent action on AM Revitalization, Second Further Notice of Proposed Rule-making (SFNPRM), dated October 5, 2018, in the above-captioned proceeding. In that Notice, the Commission has solicited comments on its various further specific proposals to revitalize AM radio and also invited submission of further proposals. Based on experience from the 65-year history of our firm and its founder, Louis A. King, MSEE, PE, providing engineering consulting and product services to the licensees of U.S. AM radio stations as well as many international broadcasters, we intend with these comments to provide focused analyses of the Commission's specific proposals related to AM transmission standards and also add to the discussion with further proposals we believe to be essential for AM revitalization. Our comments will focus on several over-arching needs for AM radio, plus specific Commission policy changes that will facilitate improving the coverage of all stations in the existing AM band. We believe that the Commission's stated goal of truly revitalizing the AM broadcasting service can only be achieved by a concerted, multi-faceted approach to this complex technical, economic, and policy challenge. Ultimately, the American listening public will be the real beneficiary of these changes.

EXECUTIVE SUMMARY

In this section we summarize our final conclusions and recommendations to the Commission as Reply Comments to this action on AM Revitalization (FCC 18-139).

(1) ***The proposed radical changes to the AM protection contours are totally unjustified***. For nearly a century, the existing Rules have adequately protected AM stations from mutual co-channel and adjacent-channel interference and have fostered a robust expansion of the AM broadcast band, providing a key service to the American public. The traditional engineering standards originally promulgated by the Commission for the AM band, based on realistic physics and engineering considerations, have been similarly adopted worldwide by the ITU and WARC organizations and are fully endorsed by the world's radio engineering bodies. The existing U.S. contour protection ratios (26 dB co-channel and 6 dB adjacent-channel) have been adopted verbatim in the New World (WARC Region 2), and with a few very minor differences, have been embraced in Europe and elsewhere (i.e., 30 dB daytime and 27 dB nighttime co-channel for WARC Regions 1 and 3). [The 40-dB figure adopted by the EBU is referenced to a 1.0 mV/m contour, which translates to 28 dB D/U (desired-to-undesired signal ratio) at the existing standard 0.5 mV/m contour (current §73.37 rule for Classes B, C, and D stations)]. We herein cite the specific ITU Recommendation document ITU-R BS.560-4 (1997):

> In § 1 of this Recommendation, a value of 40 dB is given for use in bands 5 (LF) and 6 (MF) for co-channel transmissions.
>
> With this value of RF protection ratio, high quality reception is possible. For planning purposes however, it may be necessary to adopt lower values. This problem has been studied by the EBU and in Japan. The values that have been proposed are 30 and 26 dB, respectively, and in fact, a value of 30 dB was agreed by the Regional Administrative LF/MF Broadcasting Conference (Regions 1 and 3) (Geneva, 1975), whereas 26 dB was used by the Regional Administrative MF Broadcasting Conference (Region 2) (Rio de Janeiro, 1981).

The current U.S. rules are thus strikingly consistent with the corresponding ITU/WARC recommendations. ***Unfortunately, the major alterations to the protected contours suggested by the Commission staff and several Commenters in this proceeding are in fact based on two highly faulty assumptions***. These are: **(1)** that the increasingly degraded signal-to-noise ratio (SNR) in the AM band cannot ever be remedied; and **(2)** that all AM receivers will continue to have very narrow bandwidths (~ 2-3 kHz). **Neither condition is in reality true**: **(1)** the "SNR" issues plaguing AM radio can in general be rapidly resolved (in probably 2-5 years) by

aggressive Commission enforcement of the existing Part-15 and -18 Rules for Intentional, Incidental, and Unintentional Radiators (as was detailed in the "Noise" section in our Comments document [1]), coupled with the limited lifetimes of cheap, noisy, non-FCC-compliant switching power supplies and other consumer devices; and **(2)** the increasing presence in the consumer market of wideband-capable AM receivers, including DSP-based analog receiver units with selectable or adaptive bandwidths of up to ±9 kHz (e.g., the Tecsun PL-880 portable), as well as a variety of digital (HD Radio®) products. Wideband AM formats, including both CQUAM analog and the new Xperi/Ibiquity all-digital on-channel format, would be severely impacted by the proposed changes to the existing contour-protection rules, as summarized below. Only by willfully ignoring the need for wider-bandwidth radios (both analog ***and*** digital) can the proposed radically increased levels of co-channel and adjacent-channel interference be justified. In addition, the Commission's proposed degradations in 2nd- and 3rd-adjacent interference protections will grossly overload many existing receivers, including HD digital units, which have been designed to the post-1991 allocation scheme [1,2].

Table 1: Existing versus Proposed § 73.37 AM Protections

Frequency Separation (kHz)	Existing Contour (Class A) (mV/m)	Proposed Contour (Class A)	Existing Contour (Classes B, C, D) (mV/m)	Proposed Contour (Classes B, C, D) (mV/m)	Contour of any other station (mV/m)	Contour of any other station (mV/m)	Potential increase in interference compared to current §73.37
0	0.1	0.5	0.025	0.025	0.500 (Class A)	0.500 (Class A)	+28 dB
			0.5	0.5	0.025 (Class A)	0.025 (Class A)	+28 dB
			0.100	0.100	2.0 (Other classes)	2.0 (Other classes)	+24 dB
			2.0	2.0	0.100 (Other classes)	0.100 (Other classes)	+24 dB
±10	0.1	0.5	0.5	0.5	0.5 (Class A)	0.5 (Class A)	+6 dB
			2.0	2.0	2.0 (Other classes)	2.0 (Other classes)	+30 dB
±20	5.0	25.0	5.0	25.0	5.0 (All classes)	25.0 (All classes)	+28 dB
±30	25.0	---	25.0	Unlimited Interference	25.0	Unlimited Interference	+Infinite!

Table 2: Details of Existing versus Proposed 73.37 AM CCI/ACI Protections (D/U)

Class	Contour (mV/m)	Existing §73.37 (CCI/ACI)	ITU BS.360 (CCI/ACI)	FCC-SNPRM Proposed (CCI/ACI)	dLR Proposed (CCI/ACI)	bTs Proposed (CCI/ACI)	CTJC Proposed (CCI/ACI)	FCC-SNPRM Degradation (dB)
A	5.0	94/74	96/70	66/40	72/46	56/26	82/56	+28
	2.0	78/58	80/54	50/24	56/30	40/20	66/40	+28
	1.0	66/46	68/42	38/12	44/18	28/8	54/28	+28
	0.5	54/34	52/26	26/0	32/6	16/-4	42/16	+28
	0.2	38/18	40/14	10/-16	16/-10	0/-20	26/0	+28
	0.1	26/6	28/2	-2/-28	4/-22	-12/-32	14/-12	+28
B,C,D	5.0	66/46	68/42	42/16	48/22	56/36	54/28	+24
	2.0	50/30	52/26	26/0	32/6	40/20	38/12	+24
	1.0	38/18	40/14	14/-12	20/-6	28/8	26/0	+24
	0.5	26/6	28/2	2/-24	8/-18	16/-4	14/-12	+24

Table 1 above summarizes the existing AM contour protections in §73.37 of the Commission's AM Rules, based on the longstanding 26-dB allowable co-channel interference (CCI) criteria, along with the slightly more conservative 6-dB adjacent-channel interference (ACI) limits adopted in 1991, as opposed to the recent disconcerting SNPRM proposals from the Commission, along with the levels of desired-to-undesired (D/U) signal degradation achieved thereby, as was also noted in earlier SNPRM Comments by Henry Engineering. In response to the SNPRM, the Commenters have offered a wide variety of viewpoints, usually in support of the existing Rules from Class-A station owners and (not surprisingly) generally favorable to reducing contour protections from Class-B and -D station owners and others who stand to benefit from potential facility power increases. As delineated in Table 2, in addition to the Commission staff, several consulting engineering firms have individually (and thoughtfully) advocated differing reductions in the existing protections, including du Treil, Lundin, and Rackley (dLR), Broadcast Technical Services (bTs), and Carl T. Jones Corporation (CTJC). For comparison, Table 2 also contains the CCI and ACI figures at several key contours from the existing §73.37 Rules, plus the corresponding ITU-R Recommended guidelines in their BS.360 document, most recently updated in 1997. The Table clearly reveals the substantial degradation to existing AM interference-limited coverage (both CCI and ACI) engendered by the various proposals, some more severe than others, though the net result is inevitably less coverage, with essentially constant station-to-station interference replacing the more geographically distributed (and often intermittent) EMI from power lines and other electrical sources. In the table, the pink-shaded boxes represent generally unusable reception conditions due to the associated D/U ratios. It should be noted that the reduction on ACI protections is particularly troublesome due to the modulation-sideband splatter of ACI signals.

As we stated in our earlier Comments to this Action, perhaps the most unfortunate aspect of the proposed (degraded) protection limits is simply the confusion between RF ***noise*** (natural and/or manmade) and ***interference*** (from other radio stations). The stated impetus for permitting these higher transmitted power levels is actually to improve the SINR [signal-to-(interference+noise) ratio, $^{S}/_{(I+N)}$], where the denominator represents the sum of the RF interference power and the external ambient noise power, which is itself totally independent of the broadcast signals' magnitude! Unfortunately, the thinking behind the revised protection contours offered in the SNPRM utterly fails to distinguish between the actual noise (from

atmospheric plus extraneous manmade sources) and the resulting severely increased station-to-station interference. The AM band needs better SNRs, not worse SIRs (signal-to-interference ratios)! Obviously, nothing can be done to regulate natural noise, but the Commission can and must enforce its own existing Part-15 and -18 regulations to bring harmful emissions of electronic devices in the AM (and other radio bands) into meaningful compliance. ***In brief, as to the contours, "if it works, don't fix it"; relative to the noise, regulate it down to a de minimis level via administrative action. Indeed, no Rules changes (§73) are in fact necessary, just the active enforcement of those already on the books (§15 and §18).***

(2) *Revitalizing AM broadcasting must begin with active enforcement by the Commission of these Part-15 and Part-18 noise regulations.* Historically, for many decades the foundation for the success of AM broadcasting has been due to the Commission's establishment of rational allocation standards that have supported a workable signal-to-(interference+noise) ratio (SINR) in the vast majority of listening environments. In fact, the "noise" (random + impulse noise from lightning and static + broadband noise from man-made sources) and "interference" (from other radio stations) are all truly independent of each other and must be dealt with individually. In the past (perhaps 30-40 years ago), noise contributions from power lines and the like were generally quite modest, as Utilities were diligent to maintain their systems in very good working order; bad AC power junctions and insulators were detected and repaired promptly. Even clear-channel AM signals, from many hundreds of miles distant, were readily receivable on both portable and home radios, both indoors and outside, without noticeable local utility interference; in fact, the biggest reception problem then was usually skywave fading! Now, the noise situation is drastically worse, as we addressed earlier in this Proceeding. The noise term (N) in the SINR expression above, which used to be much less than the interference term (I), is now often dominant, especially in dense urban environments. This shift has now led many broadcast engineers to think only in terms of SNR, essentially ignoring the interference term. ***Unfortunately, both terms are still valid and must be considered***. Decades ago, the Commission set up comprehensive, honest, yet conservative AM broadcast interference standards that have since been adopted worldwide, most notably by the ITU and WARC agreements. Clearly, man-made noise was lower back then, but we believe that abandoning the time-tested allocation Rules (intended to minimize mutual interference and so preserve signal coverage) and trying to solve the SINR

dilemma by arbitrarily raising transmitted power levels is fraught with severe implementation consequences, many of which are, of course, unintended. Though the task to control AM-band noise (as well as in other bands) at first glance seems nearly insurmountable, we believe that a prioritized approach, coupled with dedicated, consistent, and persistent Commission action, ***led from the top***, will prevail. To achieve this, we suggest the following steps, in sequence:

- **(1)** Rewrite and adopt new Part-15 Incidental Radiator definitions and emission standards, paralleling those existing for Intentional and Unintentional Radiators, and shifting primary legal responsibility for non-complying Part-15/18 devices to the final seller rather than the end-user;
- **(2)** Through OET and the FCC Lab, establish approved RFI/EMI measurement techniques and procedures to assist Utilities (power, phone, cable, etc.), consultants, and broadcasters in establishing compliance and interference troubleshooting. Also certify multiple private RF compliance labs to handle most of the routine testing load;
- **(3)** Provide a web-based clearinghouse to document complaints and resolution actions;
- **(4)** Issue a friendly enforcement reminder letter concerning the revised Part-15 Regulations to all affected Utilities, phone, and data carriers, based on State Public Service Commission and similar databases;
- **(5)** After about 90 days, start the process of formally identifying problem areas, beginning with the most egregious cases, as reported by AM broadcasters, the consulting-engineering community, SBE members, amateur operators, and other technical personnel;
- **(6)** Begin issuance of Letters of Enforcement to offending Utilities and other entities;
- **(7)** Simultaneously, issue a friendly enforcement reminder letter to all electronics wholesalers and retailers who handle consumer and industrial Part-15 and Part-18 devices (e.g., Walmart, Best Buy, Home Depot, Lowe's, Target, Sears, Amazon, Newark, Digi-Key, Allied);
- **(8)** After about 90 days, request Part-15/Part-18 Compliance Letters and proof thereof via certified lab measurements;
- **(9)** As follow-up, have OET and FCC Lab personnel conduct spot tests to sample Part-15 and Part-18 devices sold in stores or on the web;

- **(10)** Set up a steep monetary fine structure to help finance Commission enforcement costs; eventually, enforcement could be nearly fiscally self-sustaining.

We assert that with vigorous action, including Part-15/18 enforcement actions and fines, by the Commission, the vast bulk of the Utility-related noise issues on the AM band could be resolved within about 2 years, though there will always be ongoing incidents until the Utilities are sufficiently "trained" to become more-or-less self-policing, with help from the AM broadcasters to resolve local noise problems as quickly as possible. The mess with Part-15 and Part-18 devices will take a bit longer to resolve, as these devices fail and/or cycle into newer devices (which should by then be fully compliant). We predict that these inexpensive, low-quality consumer devices are unlikely to survive more than 3-5 years at most; the industrial-grade units (e.g., LED traffic signals) may be required to have forced EMI/RFI filtering upgrades, which should not be more than 10% of the unit's cost, as a warranty repair.

(3) *Massive allocation changes cannot revitalize AM radio*! As has been cited, the Commission staff and numerous Commenters, especially those in the engineering community, have proposed several substantive changes to the Commission's Rules for co-channel protection of standard contours on virtually all classes of stations, based on the overriding assumptions that neither the levels of RFI nor average AM receiver performance will ever improve. Given these pessimistic assumptions, the arguments presented are logical, but we fundamentally and emphatically disagree with that thesis. **For the foreseeable future, we strongly encourage the Commission to defer any such irreversible allocation actions until all of the initial measures we have proposed (noise regulation, synchronization, and advanced DSP-based receivers) have truly had sufficient time to work.** ***If these protection limits are reduced now, there will be no later chance of ever recouping the lost coverage areas — the zones previously denied by noise will simply now be squashed by added co-channel (and adjacent-channel) interference from other stations.***

(4) *Immediately authorize Synchronous AM Broadcasting.* As cited in our earlier Comments, AM synchronous-booster systems could be of significant benefit to Class-C and -D stations with limited nighttime coverage, as well as other stations (mostly Class-B but also some Class-A) with deep nighttime directional-antenna nulls. All these stations could greatly benefit from the

improved population coverage at night and during critical hours, particularly where urban and suburban sprawl has expanded beyond the stations' existing strong-signal zones. Unlike FM translators, such on-channel boosters would serve to increase the AM stations' audiences while concurrently maintaining the future viability of the band. The use of synchronous boosters could clearly provide new, productive nighttime AM signals into each community from the local area, at very low cost to the stations involved and with significant public benefit. Further, these and other such synchronous boosters could well prove to be an economic boon to many struggling AM operations by permitting tailored coverage areas to match listening locales. ***In addition, the strategic use of synchronous boosters can provide at lower cost better coverage to specific close-in areas (with large populations) for all classes of stations without causing significant increases in interference to other co-channel and adjacent-channel stations. This concept could particularly yield useful increases in local stations' nighttime coverage while avoiding concurrent degradation to distant existing Class A skywave service areas, as calculated by either 50% or 25% exclusion methods (see ITU-R BS.360 document, ¶10.6) .***

In terms of synchronization of non-local co-channel AM stations, allowing for finite ground conductivities, it is evident that an improvement of 6 dB in effective co-channel levels will ***nearly double*** the interference-limited contours of the stations compared with the standard, non-synchronous case (*almost quadrupling the equivalent coverage area*). Our previous simulations and field tests [10] demonstrated that for some types of programming (i.e., with good masking properties) the effective improvement can even approach 10 dB, which could nearly triple the interference-limited coverage range! With the beats eliminated, the background audio from the co-channel stations will be clean; often, the so-called “cocktail party” effect will reduce the apparent level of those signals to the listener even further, especially in high-background ambients such as automobiles. The net result of these effects will be universally evident but particularly beneficial to nighttime operations at local Class-C and Class-D stations, whose coverage areas are already acutely curtailed by heavy co-channel skywave interference. For these latter classes, the near-quadrupling of equivalent coverage at night should be a major benefit, particularly to listeners in outlying suburban areas.

The principal drawback to the approach is a practical implementation issue – ***all stations on the channel in question (at least those with signals above the noise floor at the receiver) must be closely frequency-locked to a common precise reference as just described, or the beats***

will not be eliminated. It is therefore incumbent on the Commission to mandate the wide-area synchronization requirement for all AM stations as soon as practicable. In our view, wide-area AM transmitter synchronization is (and at very low cost) the only technology that, when adopted, will immediately benefit *all* stations, *all* frequencies, and *all* receivers, both day *and* night.

REPLY COMMENTS TO FCC 18-139. In the following Reply Comments on the Second Further Notice of Proposed Rule Making, we emphasize our general agreement with many in the broadcast engineering community, and in particular those of Brian J. Henry (Henry Engineering), who emphasize the concerns of most station owners and engineers in drastically altering the traditional (and worldwide) station protection limits embodied in the AM-band allocation structure. We also offer several specific comments which differ somewhat from those earlier perspectives but which we believe provide significant additional considerations for implementing the necessary actions by the Commission to truly achieve a comprehensive revitalization of the AM broadcast band, to the great benefit of the broadcast industry and the general public.

The major technical issue addressed in the SFNPRM is, in reality, dealing with the high levels of noise in the AM band. The current premise is that the only way to effectively address the deteriorating signal-to-noise+interference (SINR) levels for most AM listeners (at least in more urban/suburban areas) is to boost licensed radiated power levels, at the admitted cost of substantially more station-to-station interference, both co-channel and adjacent-channel. This, as is widely acknowledged, is the result of steadily increasing EMI/RFI from unlicensed and non-compliant devices, along with the effects of non-regulation of power-line and related noises from Utilities and wireline carriers. As we stated earlier, such noise has gone from essentially a background level to a foreground phenomenon over the last 30-40 years, and is currently accelerating in both level and geographic distribution. Clearly, man-made noise was lower back then, but we strongly believe that abandoning the time-tested allocation Rules (intended to minimize mutual interference and so preserve signal coverage) and trying to solve the SINR dilemma by arbitrarily raising transmitted power levels is fraught with severe implementation consequences, many of which are, of course, unintended. The two principal rationales behind these proposed "solutions" offered by the Commission and many in the industry, though logical in an engineering sense, are based on two incorrect premises: **(1)** that better, more wideband AM

receivers will never be available to the public, and thus AM is limited to voice-grade programming only; and **(2)** there will never be any real forthcoming regulatory relief for all this noise, so the only way to counter the noise pollution is to raise transmit power levels. ***We understand this pessimism, but we firmly believe the Commission and the industry can and must do better for AM to survive and prosper. Fundamentally, reducing noise via better regulation and enforcement is still the real (and only) solution, not major power increases for the minority of stations who can afford them.***

The implementation consequences of the "power approach", as we just stated, of which many are unintended, will now be discussed further. As we see it, among these drawbacks are:

- Increased co-channel and adjacent-channel interference in ***all*** cases, with often-significant reductions in stations' interference-free coverage areas;
- Inability, either through power and/or allocation limitations, to maximize facilities to meet proposed new contour protection levels (i.e., 50-kW ceilings);
- Unfair or uneven opportunities to upgrade along with neighboring co-channel stations;
- Inability for many stations to upgrade due to financial difficulties, including capital costs of new transmitter, matching, and antenna systems and increased operating power costs, with little resulting financial ROI;
- Land restrictions which preclude directional arrays to support higher powers;
- The Commission's need to make mutual upgrades "fair and balanced", to avoid increasing the gaps between "have" and "have-not" stations;
- Issues with Class-C stations, who cannot upgrade power due to existing overlapped allocations but who will suffer significantly worse adjacent-channel interference (ACI), both day and night. Again, we remind the Commission that this ACI, due to the total modulation-spectrum overlap with the desired station's sidebands, is ***very detrimental*** to the station's coverage, as the typical listener's reaction to this type of interference is a quick tune-out.

As a result, the benefits accrued by some stations able to upgrade their powers must be carefully balanced against the degradations in coverage (and finances) suffered by those who cannot upgrade.

With these perspectives, we now provide our views of the specifics of the proposed SFNPRM technical Rules changes for contour protection of Class A, B, C, and D stations. We fully agree with NAB and others that the Commission must move extremely carefully and deliberately, thoroughly understanding all pertinent commenters' and stakeholders' viewpoints before adopting such profound changes.

Commission Proposal A – Change Nighttime and Critical Hours Protection to Class A AM Stations

We agree that the 73 large, longstanding Class A stations are worthy of preserving and protecting due to their wide coverage and key roles in major emergencies as disseminators of vital information to the public, especially in scenarios involving widespread electric power failures; in such events, a portable battery-powered radio or vehicle radio may be the only source of news and status information for the affected population. We agree with other Commenters that in special emergency situations, the Commission must fully define an operating protocol to preserve wide-scale broadcasting by the dominant station(s) in these emergencies, coordinated with FEMA and the 77 stations currently designated as Primary Entry Point (PEP) facilities.

Meanwhile, the need for more local AM facilities using the clear channels and those adjacent to clear channels, particularly for new nighttime service to local communities, cannot be ignored. The Commission, in the SNPRM, has tentatively proposed: **(1)** all Class A stations should be protected, both day and night, to their 0.5 mV/m groundwave contour, from co-channel and adjacent-channel stations; **(2)** Alternative 1: the critical hours protection of Class A stations should be eliminated completely; or Alternative 2: all Class A stations should continue to be protected to the 0.5 mV/m groundwave contour; and **(3)** Alternative 1: the nighttime protection of Class A stations should be to the 0.5 mV/m groundwave from co-channel 0.025 mV/m 10% skywave; or Alternative 2: nighttime Class A stations should be protected to the greater of the 0.5 mV/m groundwave or the 50% exclusion RSS NIF level.

Our response to these three proposals are as follows: **(1)** the Commission's original proposed FNPRM Rule to protect the 0.1-mV groundwave contour for co-channel interference (CCI) and to the 0.5-mV contour for adjacent-channel interference (ACI) should be retained. It is still possible on the Interstate highways and other areas well away from power lines (except in highly urbanized areas) to receive reasonably clean groundwave signals from Class A stations over 150 miles distant; in our area on I-75 and I-40 we can receive very listenable daytime

signals from WSM (Nashville, 650 kHz); WLW (Cincinnati, 700 kHz); WSB (Atlanta, 750 kHz); and WHAS (Louisville, 840 kHz); in some cases, nearby adjacent-channel daytimers limit the reception more than the background noise. Assuming that the traditional co-channel D/U ratio of 26 dB is maintained, we believe that to avoid materially degrading the daytime coverage of Class A stations, which have traditionally maintained large total audiences over wide areas, but to also permit more local service, the protected daytime contour should be continued at 0.1 mV/m. The Commission's traditional 0.5-mV/m protection on daytime Class A from adjacent channels (0 dB) is not ideal but nevertheless still adequate. The Commission must carefully weigh the negative impacts of changing this limit.

We appreciate the Commission's desire to try to remedy the uneven situation that exists between other station classes and Class A stations. Especially with Class D stations, we recall that the Commission for the sake of more local service has appreciably accommodated them over the years. In the 1980s, the Commission authorized Post-Sunset Service Authorization (PSSA) for a substantial number of stations, and then recently gave Class D stations distinct preferences in the proceedings to obtain cross-band FM translators. In fact, Class D licensees fully understood the limitations when they acquired their daytime-only facilities. The AM band has always been a multi-tiered service (as FM is), and it is not just for Class A licensees to arbitrarily bear the burden of losing much of their interference protection without some form of compensation for what could be to a significant reduction in their license values. After all, the existence of clear-channel AM signals from distant cities has been a great incentive for many in the U.S. and elsewhere (including FCC Chairman Pai) to become interested in radio as a career or avocation.

We agree with Henry Engineering that by proposing to change radio stations' interference protection contours, the Commission is essentially proposing to change what amounts to the equivalent of a property boundary line. What then would be the Commission's strategy for compensating licensees for the interference protection that will be taken away by what essentially amounts to eminent domain?

In the realm of nighttime signals, we assert that the Commission's proposed Rule of protecting the 0.5 mV/m groundwave contour from co-channel signals ***as stated*** does not provide adequate skywave protection criteria and will markedly harm the Class A stations' coverage at night. We urge that for the time being, no change in the Class A nighttime protections be made

until more detailed studies, including a refinement of protected contours and their associated D/U values, be completed. We further agree with Comments from Broadcast Transmission Services, LLC (bTs) that a more modern, numerical approach to AM coverage studies be adopted to secure more accurate, consistent estimates of service contours and populations therein. We also assert that the 10% skywave predictions be included for Class A coverage calculations, which should retain the existing 25% exclusion methodology. Further, the suggestion by bTs to provide a minimum D/U ratio of 40 dB for co-channel and 20 dB for adjacent-channel protection at a 2.0 mV/m contour for all stations is worthy of more detailed study before any permanent rules are adopted. We would much prefer a co-channel figure of 50 dB/30 dB, as is realized by the current 0.1 mV/m (A) /0.5 mV/m (B,C,D) contour with 26 dB D/U to further improve close-in coverage SINR.

For critical hours, we vigorously oppose the proposed elimination of all such protection for Class A stations. This is simply illogical, as it ignores the physics of the ionosphere at AM frequencies within ± 2 hours of local sunrise/sunset. This protection (co-channel and adjacent) should absolutely continue as currently, though perhaps to the 0.2-mV/m contour of the Class A station. This protection is especially important in periods of reduced solar activity, which permit much more skywave during early and late daytime hours (witness any Class C channel at those times!) We understand the high cost of directional arrays for smaller stations, but reducing power at a given time (as currently done) is not a significant problem. Moving the protection contour on the Class A station could afford more power in critical hours to the smaller stations and is a useful operational compromise, though the use of synchronous boosters is a very valid alternative.

Change Nighttime RSS Calculation Methodology

We generally concur with many others in the engineering community that the nighttime RSS calculations need to be simplified, whether by returning to the traditional 50% exclusion method of RSS calculations of interfering signal strengths, or by retaining the 25% exclusions; in any event, more study is needed to fully resolve this issue. The calculations should be made on a site-to-site basis, which is much simpler and provides similar overall results to the traditional contour studies. However, due to the importance of minimizing the disturbing effects of spectral overlap by adjacent-channel signals, we believe that it would be counterproductive to achieving

quality reception to ignore the adjacent-channel contributions entirely as many have suggested (from the perspective that AM will never be other than voice-grade). We therefore suggest as a compromise that adjacent-channel signal contributions be included into the RSS calculations, with a 50% weighting for each adjacent signal prior to the co-channel RSS computations using the 50% or 25% exclusion adjustments. This obviously favors the co-channel signals but permits a realistic accounting for stronger adjacent-channel signals in the mix that could materially degrade the desired signal.

Commission Proposal B – Change Daytime Protection to Class B, C, and D Stations

This part is undoubtedly the most controversial of the proposed protection Rules changes. Although there is considerable pressure to downgrade the basic longstanding protection limits on Class B, C, and D, we note that, as we have stated earlier in the section on AM noise, the simple boosting of transmit powers, though helping the close-in signal-to-noise ratios, only does so at the expense of materially and permanently degrading fringe-area reception by replacing random and occasional impulse noise with full-time, wide-area, and pervasive co-channel and adjacent-channel interference. Actually, the correct, quickest, and most economic fix is for the Commission to strengthen and rigorously enforce its own noise Rules, including Parts 15 and 18.

Meanwhile, many Commenters seek a change to 2.0 mV as the protection contour, with a standard 26-dB D/U for CCI and a 0-dB D/U for ACI. The additional interference areas (correctly defined as zones where overlap causes D/U signal-strength ratios of less than 26 dB [i.e., a factor of 20], as dLR and others have explained, do in fact occur at the outer boundaries of the protected contour; these areas typically encompass only roughly $^{1}/_{3}$ of the total contour-overlap area. At any rate, the interference zone also extends over the full sector (based on a single interferer) outside the protection contour, thus producing excessive (i.e., > 26 dB D/U) in those outer areas previously still inside the traditional 0.5 mV/m contour. The net result is that we have traded better SINR inside the 2.0-mV/m area for much more CCI (and ACI) outside.

If, ideally, all stations could simultaneously increase power by the same proportions, the relative CCI and ACI levels would not change; however, this can never in reality be the case, since (as has been noted earlier) not all stations can increase their operational power due to statutory limits (i.e., 50 kW max.), antenna siting issues, or basic fiscal constraints.

Under the current §73.37 AM allocation rules, assuming uniform ground conductivity, the minimum co-channel D/U ratio at the 0.5 mV/m groundwave contour is 26 dB. At the 1.0

mV/m groundwave contour, the D/U ratio increases to 38 dB, and at the 2.0 mV/m contour, it rises to 50 dB. As cited by Henry Engineering, under the currently proposed allocation scheme, the co-channel D/U ratio at the 0.5 mV/m contour would be just 2 dB; at the 2.0 mV/m contour it would be 26 dB. The Commission's recent proposal therefore represents a potential 24-dB degradation in the daytime co-channel signal-to-interference ratio (SIR). This is a huge reduction in audio quality at a given signal strength contour. At the 5.0 mV/m groundwave contour, the proposed D/U ratio would only be about 42 dB, hardly qualifying as a "city grade" quality signal. If the co-channel protection groundwave contour is changed from 0.5 mV/m to 2.0 mV/m and the D/U ratio of 26 dB is unchanged, a given station could be subjected to as much as 24 dB more relative interference (D/U) at a given contour. In short, if the protection contour is changed, then the associated D/U ratio must be altered as well to maintain equilibrium.

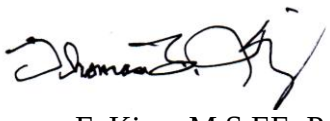
CONCLUSIONS

As we stated in response to the original 13-249 NPRM over five years ago, AM radio is a longstanding American institution, a source of unique voices, and one that we can ill afford to abandon, particularly in light of its unique groundwave and nighttime skywave propagation characteristics and tremendous reach, especially in times of local, regional, and even national emergencies***. During the recent national disasters, Hurricane Katrina and Hurricane Sandy, AM radio stations proved to be the news source that the public utilized more than any other when telecom and other services were unavailable. In addition the Primary Entry Point Network operated by the Department of Homeland Security and the Federal Emergency Management Agency to facilitate Presidential access to the US population in the event of a national emergency is primarily comprised of AM 50-kW clear channel stations Truly, this AM Revitalization action has the rare potential of conserving a unique national resource.***

We believe that AM radio stations can be relied upon to provide needed service well into the future, but the Commission must take several bold steps in the very near future to preserve AM radio for future generations of Americans. KTL believes that the suggested actions can be undertaken rapidly to encourage a general revitalization of the AM radio service, and we strongly encourage the Commission to take them now. We reiterate our agreement in principle with many of the Further Comments and Reply Comments already offered by others in the

consulting engineering community, though with some alternative suggestions. Our proposals are driven by our overriding view that to save and revitalize the AM band ***for broadcasters and the public***, the Commission must move rapidly and forcefully to enforce Part 15 and 18 Unintentional Radiator rules on Utilities and others, enforce Part 15 regulations on non-compliant imported electronics via actions against their domestic vendors and further encourage major improvements in AM receiver performance, especially to achieve near-parity with FM. Also included in our proposals to improve AM reception are the simplified adoption of synchronous booster stations to augment existing AM station coverage and the mandate of wide-area GPS-based synchronization to significantly reduce co-channel interference via the elimination of carrier beats. It is also essential that, as per Commissioner O'Rielly's statement, lacking a robust engineering consensus concerning the instant proposed major allocation Rules changes, the Commission defer any action until a high level of general agreement is achieved. Without these high-level actions, most of the other suggestions for improving AM service offered by our firm and other Commenters will likely become moot unless the listening public is incentivized to return to the band, via the rapid establishment of noticeably better audio and reception conditions throughout the U.S. ***The final, inevitable consequence of all this, if not addressed by the Commission, will be the financial failure of the all too many struggling AM stations and the and the consequent loss of service to the American public.***

Respectfully Submitted, February 19, 2019



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